Preparing Underrepresented Students for USDA Natural Resource Careers

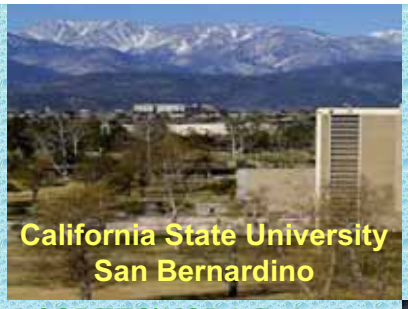
Foundation for California State University (CSU) San Bernardino

Water Resources Institute

CREES Award No. 2007-38422-18075

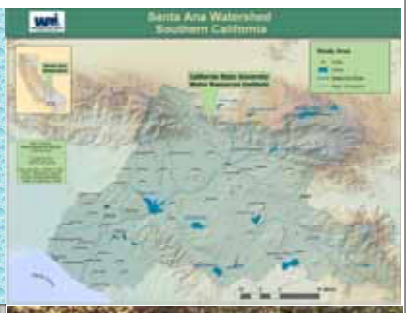
$275,000

USDA Collaborator
Redlands Office of the Natural Resource Conservation Service



Project Summary

The Water Resources Institute and the National Resource Conservation District in collaboration with other regional agencies will provide up to 30 internships, mentoring, and instruction on watershed management-related projects in the Santa Ana watershed as a result of increasing population, changing land use patterns, and expanding urbanization. They will combine scientific research assignments with training in GIS information systems for decision support.



Institutions and Agencies/Organizations Involved

- **Redlands Office of the Natural Resource Conservation Service**
- **Santa Ana Watershed Project Authority**
- **Inland Empire Resource Conservation District**
- **Riverside-Corona Resource Conservation District**
- **South Coast Resource Conservation and Development Council**
- **Western Riverside Council of Governments**
- **The Wildlands Conservancy**

CSREES\USDA Relevant Priority or Mission Area

- **Educational Need Area (e):** Student Experiential Learning
- **Primary Discipline:** Water Science/Water Resources (Watershed Management) with Information Technology, Conservation and Renewable Natural Resources, Plant Sciences, Related Biological Sciences and Environmental Sciences/Management as secondary disciplines
- **HSI Priority Area (1):** Strengthen institutional capacity... in order to respond to the identified State, regional and national educational needs in the food and agricultural sciences
- **USDA/CREES Priority:** Rural and Community Development
- **USDA Strategic Goal (f):** Protect and Enhance the Nation's natural resource base and environment

Lead Project Team

Principal Investigator

- Dr. James Noblet (Associate Professor, Chemistry and Environmental Science), the Faculty Chair of the WRI

Project Administrator

- Susan Lien Longville, Water Resources Institute Executive Director

Senior Research Associate

- Lisa Pierce, IT Consultant

Faculty Research Team

College of Natural Sciences

- 1) Dr. Joan Fryxell (Professor, Geological Sciences)
- 2) Dr. Sally McGill (Professor, Geological Sciences)
- 3) Dr. Eric Melchiorre (Associate Professor, Geological Sciences)
- 4) Dr. Tony Metcalf (Associate Professor, Conservation Biology)
- 5) Dr. Brett Stanley (Professor, Chemistry)
- 6) Dr. David Turner (Associate Professor, Computer Sciences)
- 7) Dr. Kim Williams (Associate Professor, Plant Biology)

College of Social and Behavioral Sciences

- 8) Dr. Norman Meek (Professor, Geography and Environmental Studies)
- 9) Dr. James Mulvihill ((Professor, Geography and Environmental Studies)

Objective #1

The project will select and retain up to 30 students from underrepresented groups in the Colleges of Natural Science and Social and Behavioral Sciences in disciplines related to natural resource protection.

- 30 students will be selected for a 360-hour paid internship
- An appropriate watershed management project in the Santa Ana watershed will be designed for each intern that provides a real-world opportunity for research and collaboration with watershed partners
- The interns will be supervised by faculty or professionally trained staff at the Water Resources Institute

Objective #2

A minimum of 50% of the students will achieve an acceptable level of professional competence in advanced information technology/GIS systems, measured by objective assessment and field evaluations

- The Senior Research Associate will train the interns individually or in small groups to gain proficiency with a Web-based decision support system that combined information technology (IT) and geographical information systems (GIS) to allow scientific knowledge about the Santa Ana watershed to be shared with watershed stakeholders
- The Senior Research Associate will identify additional opportunities to maximize the effectiveness of the system in assisting rural communities in the Santa Ana watershed that are impacted by expanding urbanization

Objective #3

The project will provide scientist/practitioner mentorship and applied training of students participating in the project to enhance their USDA/natural resource-related employment opportunities.

- Undergraduate interns will be mentored by faculty, participating graduate students and collaborating organizations in the watershed
- Graduate research will be mentored by faculty, more advanced graduate students and collaborating organizations in the watershed
- Interns, faculty and collaborating organizations will meet as a group twice per year share lessons learned and identify opportunities for improvement

Objective #4

Counseling and career support will be provided to interns to reinforce educational success in disciplines that are related to natural resource protection to the postgraduate level.

- The Senior Research Associate will develop a questionnaire in collaboration with the PI and Faculty Research Team to distribute to collaborating agencies to ascertain how much more employable the interns have became as a result of this project.
- At regular six month intervals, the Project Manager will meet with the collaborating agencies to evaluate the effectiveness of the interns in the Watershed Management internship program and identify additional strategies that might maximize their employability

Objective #5

The project will evaluate the effectiveness of the alternative methods of instructional delivery employed in this project and the degree to which it enhanced the quality and effectiveness of teaching, retention, and graduation of the selected students compared to the campus norm in those fields.

- At regular annual intervals, the PI, members of the Research Faculty Team, Senior Research Associate will be assembled to evaluate the effectiveness of the instructional techniques, methodologies and delivery system utilized in this project and examine to what extend the use of alternative methods of delivering instruction to underrepresented groups have enhanced the effectiveness of teaching programs and helped retain and graduate outstanding students from underrepresented groups.

Objective #6

The PI and Co-PI's on the Faculty Research Team will select one undergraduate in their junior or senior year during the first twelve months of the project and provide up to $25,000 towards the completion of a masters and start of terminal degree within 4 ½ years of the award date.

- The PI or supervising faculty member will assist the student chosen in making necessary plans to attend graduate school.
- The Project Manager will monitor the progress of the chosen student and provide semi-annual Progress Reports to the PI and members of the Faculty Research Team.
- The Project Manager, PI, Senior Research Associate and members of the Faculty Research Team will meet with the student face-to-face on an annual basis

Beneficiaries

- **Academic institutions challenged with increasing urbanization in their region will benefit from a national model that confronts the universal problem of increasing population, changing land use patterns and expanding urbanization through watershed management collaboration in the communities they serve.**
- **The Project will enhance the likelihood that students from underrepresented groups in the Colleges of Natural Science and Social and Behavioral Sciences studying disciplines related to natural resource protection will earn a degree leading to a career in the USDA's scientific workforce that protect and enhance the natural resource base and environment.**

Expected Impacts

- An increase in the retention for students from underrepresented groups including in the Colleges of Natural Science and Social and Behavioral Sciences
- An increase in the competency of students with advanced geospatial information technology (IT) systems that allow scientists to share knowledge across a broad spectrum of domains
- An increase in the encouragement received to continue education in disciplines related to natural resource protection through a Master's degree (or possibly higher)
- An increase the mentorship and training resulting in students becoming more employable for USDA careers related to natural resource protection.

Expected Impacts

- An improvement in the quality of education for underrepresented students as a result of the alternative instructional delivery system with experiential learning internships that will be employed in this project
- An increase in the interdisciplinary linkages between multiple disciplines in the Colleges of Natural Sciences and Social and Behavioral Sciences and should facilitate a more timely movement through a Bachelors degree (and possibly a Masters degree).
- An increase in "hits" on the WRI's database for the Santa Ana watershed that will enhance the protection of this challenged natural resource base and environment by providing accessible scientific knowledge to stakeholders.

Evaluation

- **A formative evaluation will focus upon the methods and objectives in the Start Up and Execution phases. It will be both quantitative and qualitative.**
- **The quantitative evaluation will include the number of students enrolled and retained in the internship program and the dollars spent for stipends. The number of graduates produced including their academic success and employment information after graduation will be quantified.**
- **The qualitative evaluation will include feedback from faculty, senior associates, paraprofessionals, and pre-baccalaureate students. An objective evaluation of the interdisciplinary instruction methods and an evaluation of the proficiency gained by interns in applied GIS and geospatial technologies will be included.**

Evaluation

- Semi-annual reports will include indicators of success and lessons learned related to capacity building, evaluation of efforts related to scientific research, evaluation of efforts related to sharing scientific knowledge on the IT system and periodic surveys and focus groups with key stakeholders.
- Student outcomes that will be evaluated including the graduation rate of interns vs. non-program graduates, intern performance on standardized assessments and satisfaction levels six months after graduation.